



TEST REPORT

Report No.: SRTC2015-9003(F)-0008
Product Name: GSM/GPRS/EDGE/UMTS/LTE Digital Mobile
Phone with Bluetooth and WiFi
Model Name: Philips S616
Applicant: Shenzhen Sang Fei Consumer Communications
Co.,Ltd.
Manufacturer: Shenzhen Sang Fei Consumer Communications
Co.,Ltd.
Specification: FCC Part15B (Certification)
(October 1, 2013 edition)
FCC ID: VQRCTS616

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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CONTENTS

1. General information	3
1.1 Notes of the test report	3
1.2 Information about the testing laboratory.....	3
1.3 Applicant's details	3
1.4 Manufacturer's details.....	3
1.5 Application details	4
1.6 Reference specification.....	4
1.7 Information of EUT.....	4
1.7.1 General information.....	4
1.7.2 EUT details	5
1.7.3 Auxiliary equipment details.....	5
2. Test information	6
2.1 Summary of the test results.....	6
2.2 Test result.....	7
2.2.1 Conducted Emissions-FCC Part15.107	7
2.2.2 Radiated Emissions-FCC Part15.109	14
2.3. List of test equipments	19
Appendix	20

1. General information

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
Address: No.80 Beilishi Road, Xicheng District, Beijing China
City: Beijing
Country or Region: China
Contacted person: liujia
Tel: +86 10 5799 6181
Fax: +86 10 5799 6288
Email: liujiaf@srtc.org.cn

1.3 Applicant's details

Company: Shenzhen Sang Fei Consumer Communications Co.,Ltd.
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park,
Nanshan District, Shenzhen
City: Shenzhen
Country or Region: P.R.China
Contacted person: linda zhang
Tel: 010-68300097
Fax: 010-68300097
Email: linda.zhang@sangfei.com

1.4 Manufacturer's details

Company: Shenzhen Sang Fei Consumer Communications Co.,Ltd.
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park,
Nanshan District, Shenzhen
City: Shenzhen
Country or Region: P.R.China
Contacted person: linda zhang
Tel: 010-68300097
Fax: 010-68300097
Email: linda.zhang@sangfei.com

1.5 Application details

Date of reception of test sample: 2nd November. 2015

Date of test: 2nd November 2015 to 27th November. 2015

1.6 Reference specification

FCC Part 15B October 1, 2013 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	GSM/GPRS/EDGE/UMTS/LTE Digital Mobile Phone with Bluetooth and Wi-Fi
FCC ID	VQRCTS616
Frequency Range	GSM850/WCDMA Band V: Tx:824~849MHz Rx:869~894MHz PCS1900/WCDMA Band II: Tx:1850~1910MHz Rx:1930~1990MHz
Rated Output Power	GSM850:33.0dBm PCS1900:30.0dBm WCDMA:24.0dBm
Modulation Type	GSM/GPRS:GMSK EDGE:GMSK WCDMA:QPSK
Emission Designator	GSM/GPRS EDGE WCDMA
Duplex Mode	FDD
Equipment Class	Class B
Duplex Spacing	GSM850/WCDMA Band V:45MHz PCS1900/WCDMA Band II:80MHz
Antenna Type	PIFA Antenna
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.8V
Extreme Temperature	Lowest: -30°C Highest: +50°C
Extreme Voltage	Minimum: 3.5V Maximum: 4.35V
HW Version	WMDKa
SW Version	Philips_S616_1539_V01_AG

1.7.2 EUT details

Product Name	Model Name	IMEI
Philips S616	Philips S616	868044020011598

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Charger

Equipment	Charger
Manufacturer	Shenzhen cyclelong power-tech Co., ltd
Model Number	SKL-05L10
S/N	433900864221
Input Voltage	100V-240V a.c.
Output Voltage	5.0V d.c.
Frequency	50/60Hz

AE (Auxiliary Equipment) 2#: Battery

Equipment	Battery
Manufacturer	Shenzhen cyclelong power-tech Co., ltd
Model Number	AB3000GWMT
Capacity	3000mAh
Rated Voltage	3.8V d.c.

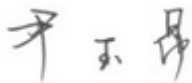

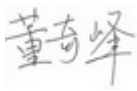
AE (Auxiliary Equipment) 3#: Headset

Equipment	Headset
Manufacturer	Dong Guan Tenji Technology Industrial Co Ltd
Model Number	TJ101156

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	Conducted emissions	15.107	Pass
2	Radiated emissions	15.109	Pass

Approved by Mr. Yin Yuang Director of the test department 	Checked By Mr. He Jia Project manager of the test department 
Tested by: Mr. Dong Qifeng Test engineer 	Issued date: 2015.12.02

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
21.4	37.3%	101.1kPa

Test Setup with laptop:

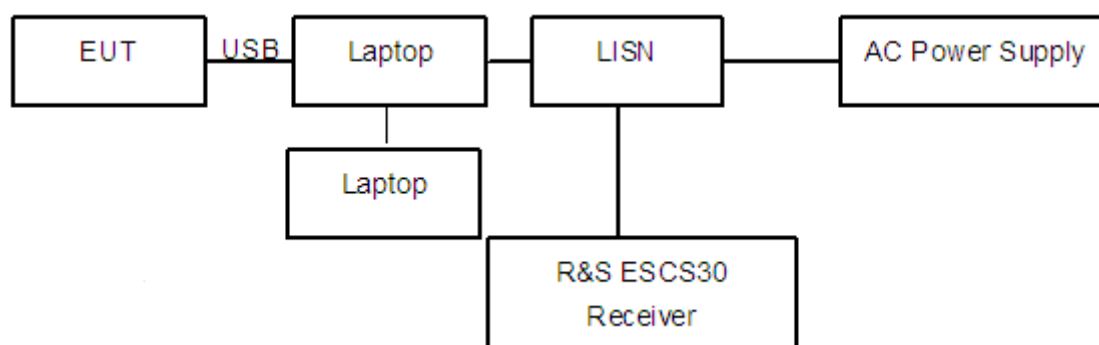


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The accessories of the EUT are connected with the EUT such as headset etc. The EUT was exercised during the testing by data read and write cycles repeated with internal storages connecting with a laptop via the USB cable. The laptop's LAN port is connected with another laptop via cable. And the data transferring between two laptops is maintained.

The AC main power supply of the laptop is connected to LISN and LISN is connected to the reference ground. The test set-up and the test methods are performed according to ANSI C63.4

Then start the test software ES-K1. Sweep the whole frequency band through the range from 150 KHz to 30 MHz. The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.

The data of cable loss has been calibrated in full testing frequency range before the testing.

Test Setup with charger:

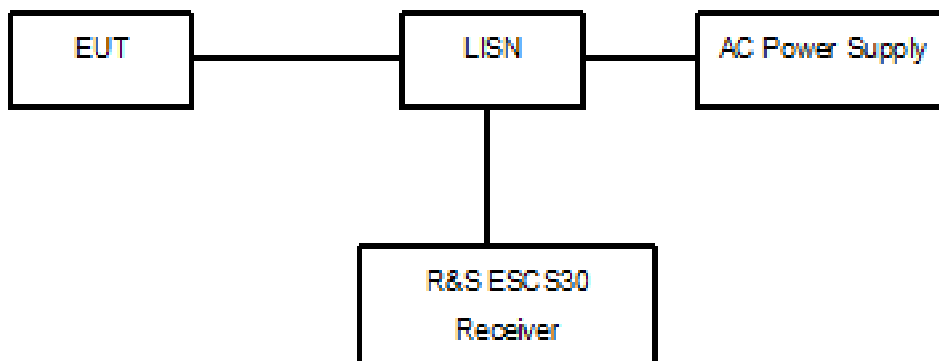


Figure 2

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT is connected with LISN via the charger. The LISN is connected to the reference ground. The accessories of the EUT are connected with the EUT such as headset etc.

The test set-up and the test methods are performed according to ANSI C63.4. Then start the test software ES-K1. Sweep the whole frequency band through the range from 150 KHz to 30 MHz. The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.

The data of cable loss has been calibrated in full testing frequency range before the testing.

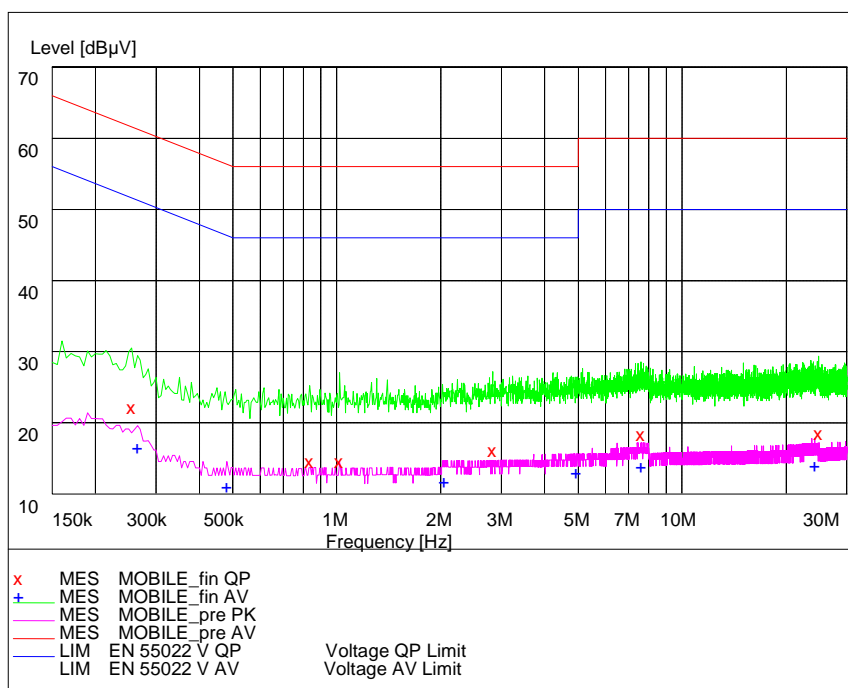
Limit:

Frequency of Emission(MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15~0.5	66 to 56*	56 to 46*
0.5~5	56	46
5~30	60	50

Note: * Decreases with the logarithm of the frequency

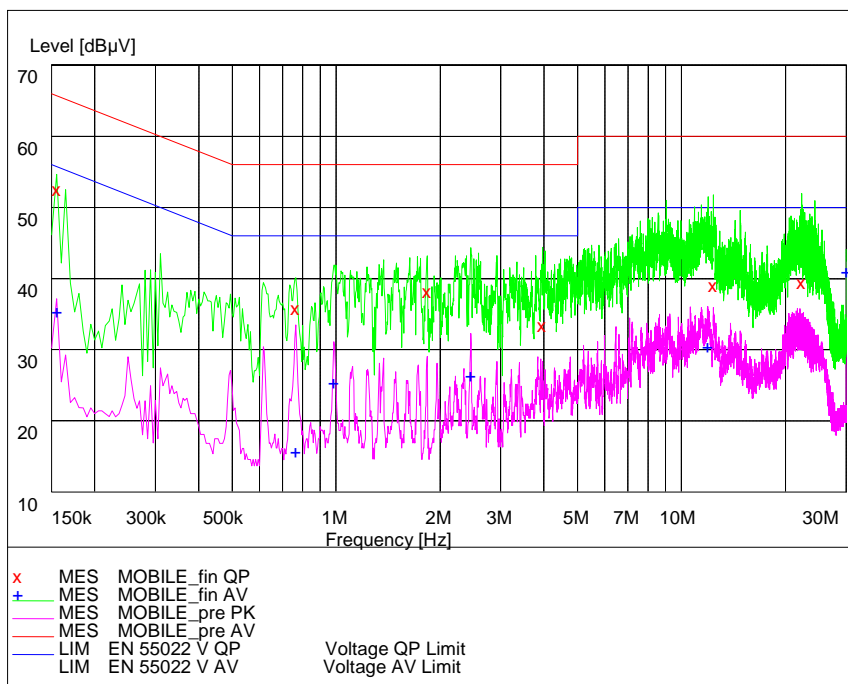
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT+Laptop:



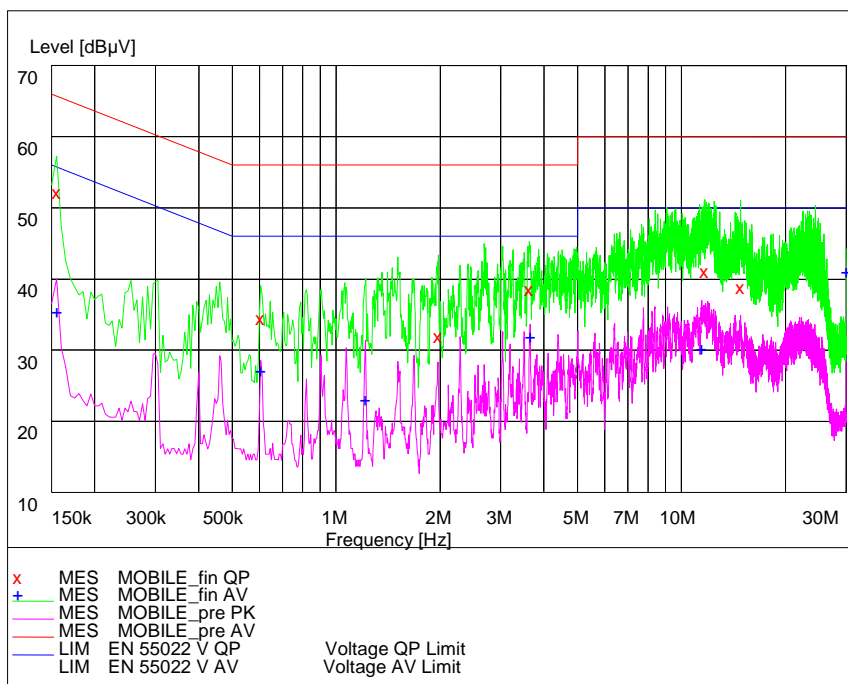
Pic2. Conducted emission L Line

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.155000	54.10	20.1	66	11.6	---	---
0.765000	37.50	20.0	56	18.5	---	---
1.835000	39.90	20.1	56	16.1	---	---
3.965000	35.20	20.3	56	20.8	---	---
12.370000	40.70	20.7	60	19.3	---	---
22.290000	41.10	21.0	60	18.9	---	---

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.155000	37.00	20.1	56	18.7	---	---
0.765000	17.30	20.0	46	28.7	---	---
0.985000	27.10	20.1	46	18.9	---	---
2.455000	28.00	20.2	46	18.0	---	---
11.935000	32.10	20.7	50	17.9	---	---
30.000000	42.60	21.3	50	7.4	---	---



Pic3. Conducted emission N Line

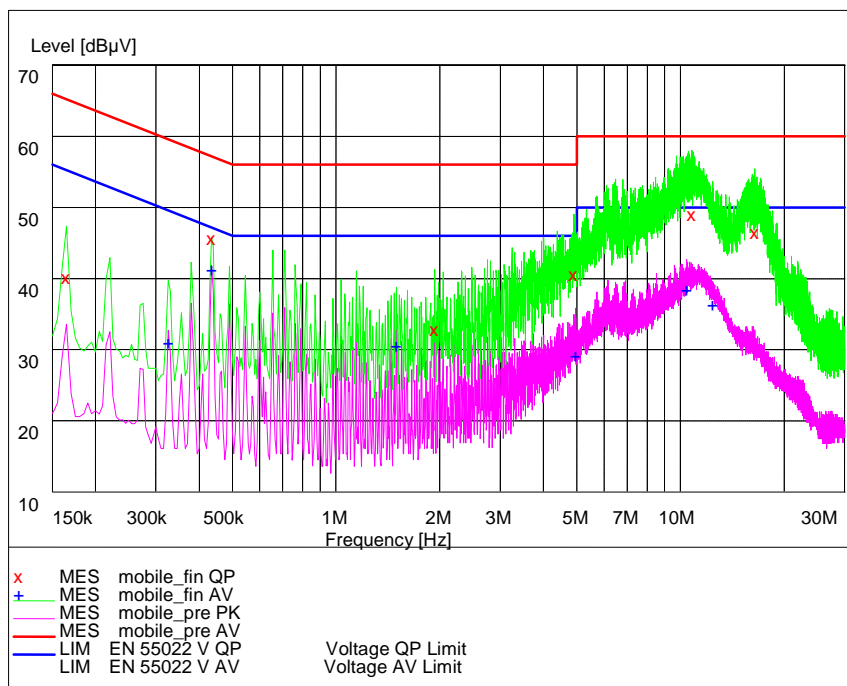
MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.155000	53.80	20.1	66	11.9	---	---
0.605000	36.10	20.1	56	19.9	---	---
1.980000	33.60	20.3	56	22.4	---	---
3.630000	40.20	20.3	56	15.8	---	---
11.705000	42.70	20.7	60	17.3	---	---
14.865000	40.40	20.7	60	19.6	---	---

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.155000	37.20	20.1	56	18.5	---	---
0.605000	28.80	20.1	46	17.2	---	---
1.215000	24.80	20.1	46	21.2	---	---
3.650000	33.60	20.3	46	12.4	---	---
11.455000	31.90	20.6	50	18.1	---	---
30.000000	42.70	21.3	50	7.3	---	---

EUT+Charger:



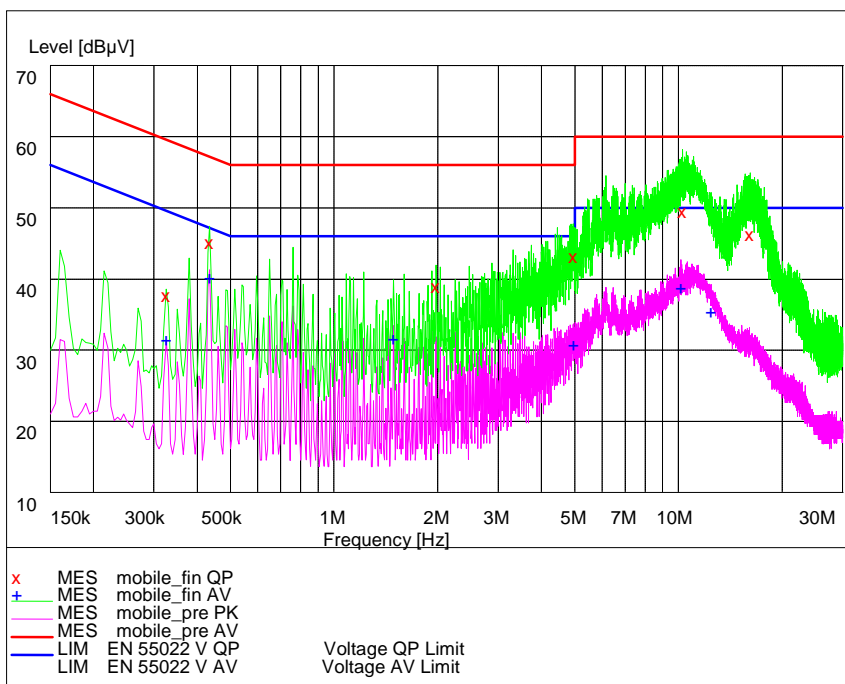
Pic4. Conducted emission L Line

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.165000	41.90	20.2	65	23.3	---	---
0.435000	47.20	20.1	57	9.9	---	---
1.935000	34.50	20.2	56	21.5	---	---
4.905000	42.20	20.4	56	13.8	---	---
10.780000	50.70	20.6	60	9.3	---	---
16.435000	48.10	20.8	60	11.9	---	---

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.325000	32.60	20.1	50	17.0	---	---
0.435000	42.90	20.1	47	4.3	---	---
1.495000	32.30	20.2	46	13.7	---	---
4.960000	30.80	20.4	46	15.2	---	---
10.430000	40.20	20.6	50	9.8	---	---
12.425000	38.00	20.7	50	12.0	---	---



Pic5. Conducted emission N Line

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.325000	39.30	20.1	60	20.3	---	---
0.435000	46.70	20.1	57	10.5	---	---
1.980000	40.60	20.3	56	15.4	---	---
4.960000	44.80	20.4	56	11.2	---	---
10.295000	51.20	20.6	60	8.8	---	---
16.155000	47.90	20.8	60	12.1	---	---

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.325000	33.20	20.1	50	16.4	---	---
0.435000	41.90	20.1	47	5.3	---	---
1.490000	33.40	20.2	46	12.6	---	---
4.960000	32.40	20.4	46	13.6	---	---
10.170000	40.40	20.6	50	9.6	---	---
12.450000	37.10	20.7	50	12.9	---	---

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
20.8°C	35.1%	100.9kPa

Test Setup:

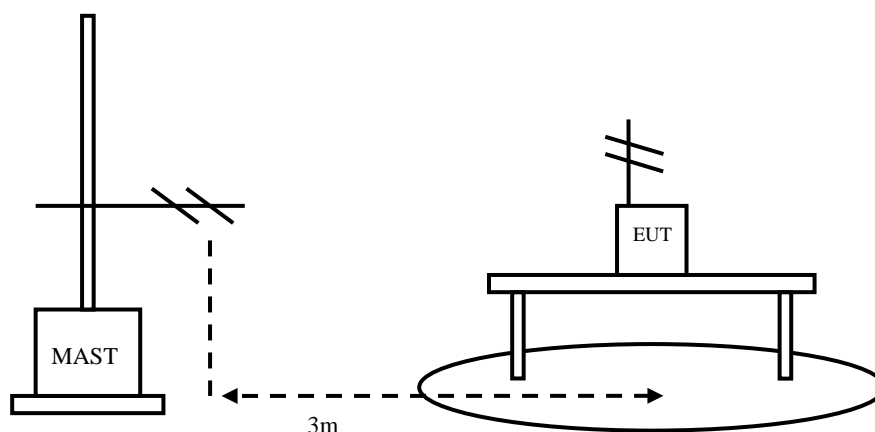


Figure 3

Test Procedure:

EUT+Laptop:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The accessories of the EUT are connected with the EUT such as headset etc. The EUT was exercised during the testing by data read and write cycles repeated with internal storages connecting with a laptop via the USB cable. The laptop's LAN port is connected with another laptop via cable. And the data transferring between two laptops is maintained. The test set-up and the test methods are performed according to ANSI C63.4

Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated

with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.

The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing.

EUT+Charger:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The EUT should work in idle mode. The accessories of the EUT are connected with the EUT such as headset etc. The test set-up and the test methods are performed according to ANSI C63.4.

Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow: 1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.

The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing.

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

Limit:

Frequency of Emission(MHz)	Limits	
	Detector	Unit (dB μ V/m)
30~88	Quasi-peak	40
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46
960~1000	Quasi-peak	54
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54
	Peak	74

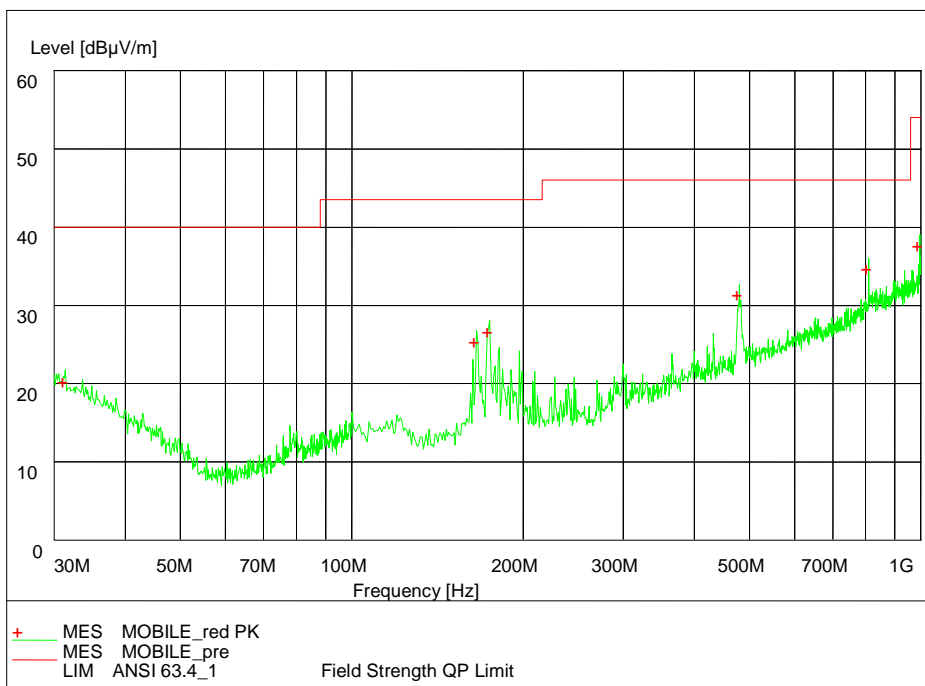
Test result:
 EUT+Laptop

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
30.14	22.74	7.4	15.34	Vertical
165.48	27.51	10.8	16.71	Vertical
175.95	27.40	10.8	16.60	Vertical
480.31	32.10	12.9	19.20	Vertical
809.08	35.18	14.7	20.48	Vertical
993.93	39.40	14.8	24.60	Vertical

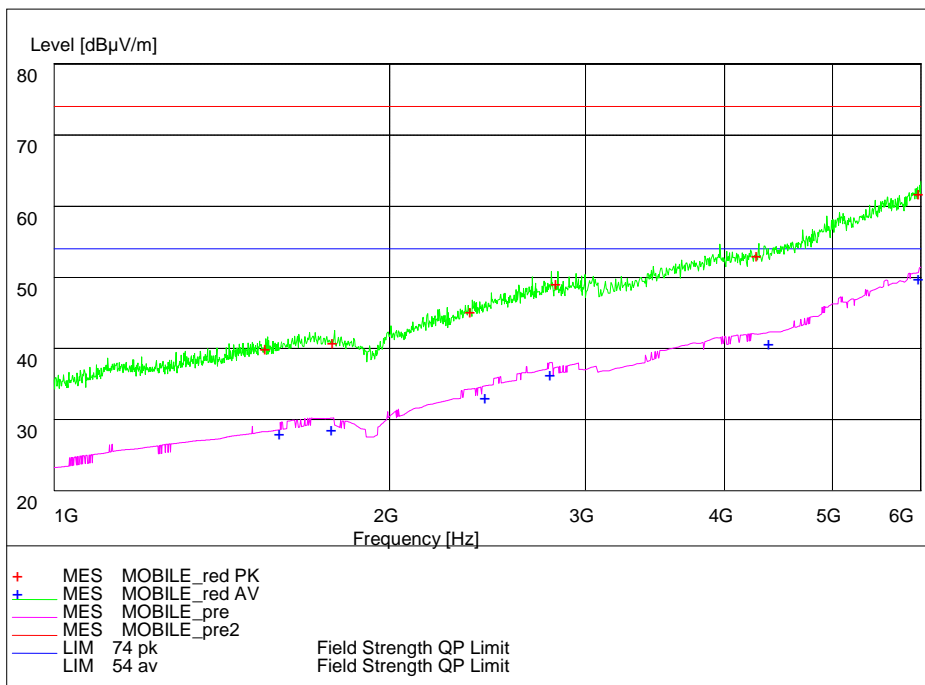
EUT+Charger

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity
71.94	29.8	8.8	21.00	Vertical
72.51	34.9	8.9	26.00	Vertical
73.77	33.9	9.0	24.90	Vertical
74.89	32.4	8.9	23.50	Vertical
75.59	33.7	8.8	24.90	Vertical
162.53	30.6	10.8	19.80	Vertical

EUT+Laptop:

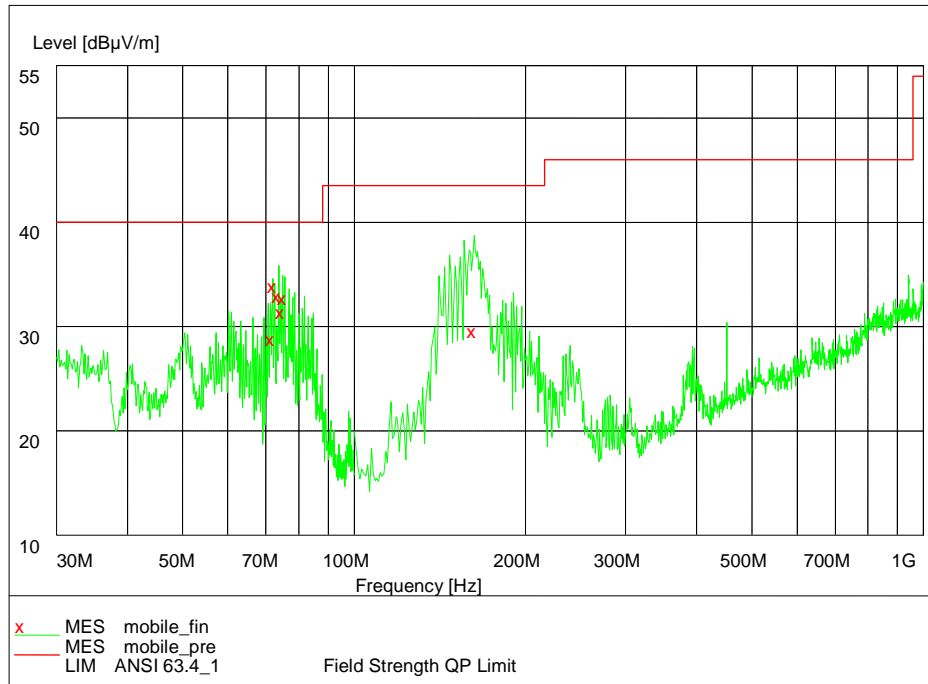


Pic6. Radiated emission (30MHz – 1GHz)

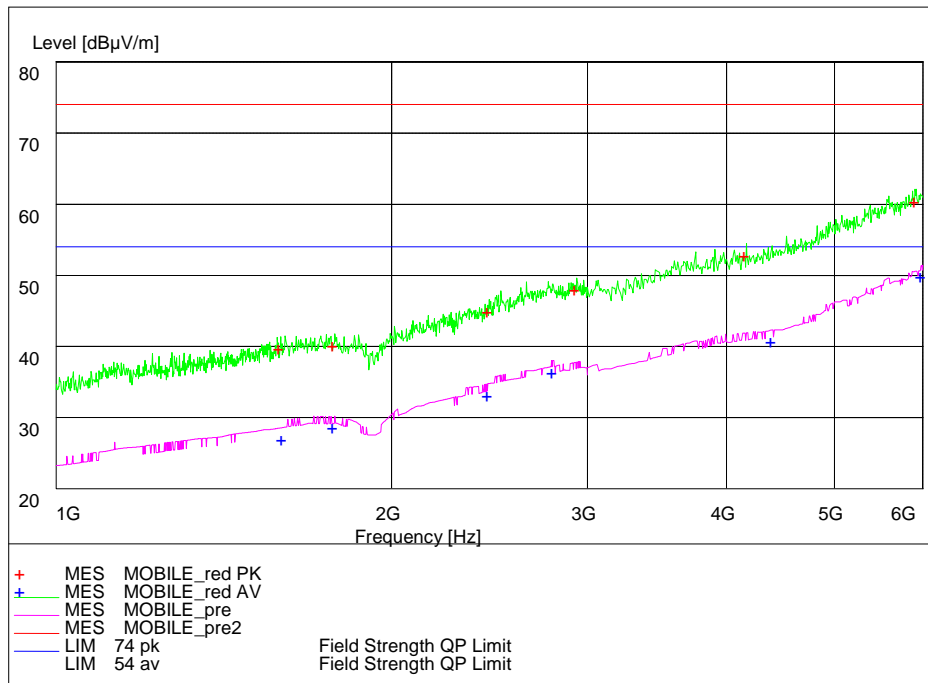


Pic7. Radiated emission (1GHz – 6GHz)

EUT+Charger::



Pic8. Radiated emission (30MHz – 1GHz)



Pic9. Radiated emission (1GHz – 6GHz)

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	20 th Aug. 2016
2	ESI 40 EMI test receiver	R&S	100015	20 th Aug. 2016
3	E5515C(8960) Mobile Station Tester	Agilent	GB44050904	20 th Aug. 2016
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	20 th Aug. 2016
5	ESCS30 EMI test receiver	R&S	100029	20 th Aug. 2016
6	HL562 Ultra log test antenna	R&S	100016	20 th Aug. 2016
7	ESH3-Z2 Pulse limiter	R&S	10002	20 th Aug. 2016
8	LS16C AMN	AFJ	16011306281	20 th Aug. 2016
9	ESH2Z11 LISN	R&S	50FH-020-10	20 th Aug. 2016
10	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	20 th Aug. 2016
11	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	20 th Aug. 2016
12	PS2000 Turn Table	FRANKONIA	-----	20 th Aug. 2016
13	MA260 Antenna Master	FRANKONIA	-----	20 th Aug. 2016
14	ES-K1EMI test software	R&S	-----	20 th Aug. 2016
15	HL562 Receive antenna	R&S	100167	20 th Aug. 2016

Appendix

Appendix1 Test Setup